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that they have the most intimate relation with the latter. After swimming about as ciliated larvæ, the shell or ectocyst develops and the larva becoming stationary, soon assumes the mature Polyzoan condition.

The description of the metamorphosis and mode of budding of the polypite in the different forms is fully detailed and illustrated by beautiful figures. As seen in *Phalangella flabellans* (Cyclostomes) the larva, after becoming fixed to some object, consists of a white pyriform mass, closely enveloped by an ectocyst, with numerous fat globules between the latter and the white mass. The ectocyst swells into a discoidal sac, with endocyst, ectocyst, and an external anhistic zone, while the internal whitish mass transforms into the polypide. The discoidal sac formed by the endocyst

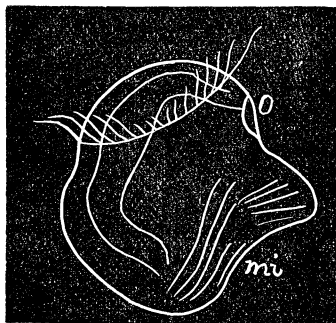


FIG. 9.—Molluscan larva.

constitutes simply the basal disc of the primitive cell. The future opening of the cell appears on the upper surface of the cell. The budding out of the secondary cells of the polyzoarium is then described. It begins by the appearance of a cell placed in front and below the primitive cell, and which borders it on each side; its secondary cell then divides into two, each of which gives successively origin to three cells, and we thus arrive at an Idmonea stage, and finally the Phalangella stage is reached, the process being a dichotomous mode of budding quite analogous to that which produces the cormus, spread out in plates, of Escharina.

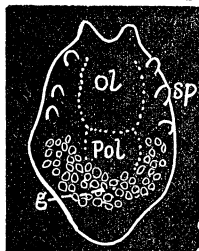


FIG. 10.—*Porella larvis*, primitive cell almost complete. *Pol*, polypide; *g*, fat cells. *sp*, rudimentary spines; *ol*, opening of the cell.

The development of *Membranipora pilosa* is given with much detail. The larva of this species is provided with a bivalve shell, so that it was by Semper and Claparède considered as a Lamellibranchiate larva, but was proved to be a young Polyzoan by Schneider, in 1869. Barrois finds it impossible to compare the shell of this larva to that of the Lamellibranchiates, and considers its metamorphosis as like that of other Chilostomes.

The work must be considered as the most important general treatise on the development of Polyzoa in existence, that of Nitsche being less complete, though of a high order of excellence.

FRAZER'S REPORTS OF PROGRESS IN THE DISTRICT OF YORK, ADAMS, CUMBERLAND AND FRANKLIN COUNTIES, PENNSYLVANIA.¹—Reports C of the Second Geological Survey of Pennsylvania, and

¹ *Second Geological Survey of Pennsylvania*. Published by the Board of Commissioners. J. B. Pearce, Secretary; J. P. Lesley, State Geologist. 1876.

CC, CCC, etc., relate to the counties lying in the south-east angle of the State, which have been assigned to Prof. Frazer.

Report C, 1874, is devoted to a study of York and Adams counties, but more particularly the former. Pages 1 to 77 describe 126 ore banks, both new and old (at that date), and their correct location on the general map renders apparent for the first time a law governing their position in definite horizons. Pages 78 to 87 describe Section 1. The description differs from the same section as given by Rogers in some important particulars. In it the first reliable measurement of the perpendicular thickness of the "Auroral" limestone, made during the survey, finds place. Prof. Rogers took the clearly marked planes of fine lamination for cleavage and occasional joints of low angle for that of fine bedding; by which means he reduced the total thickness of the measures very much. In the synclinal, whose axis lies very near the Wrightsville—Columbia bridges, the thickness appears as 2800 feet +.

It may be remarked, as a new feature in delineation, that the symbols characterizing the different strata are continued for about 3000 feet above the line of ocean level as well as below it, the present surface being indicated by a profile. This permits a more comprehensive view of the differences between formations, emphasizes faults, and hints at the possible amount of erosion.

Section No. 2, across the mesozoic beds, is interesting as exhibiting an anticlinal on their southern margin. On pp. 104–114 some chemical and structural differences are shown to obtain among the limestones united under the name of Auroral. Later we have an interesting chemical and microscopic analysis of the dolerites of Adams county, in which they are shown to differ from those of Connecticut, in having two mol. Labradorite and one of Pyroxene.

Prof. Frazer's view of the origin of the limonites is favorable to their derivation, in the main, from the pyrite and carbonate of iron among the hydro-mica schists.

Report CC continues the result of the survey of York and Adams counties with part of that of Franklin. The important magnetic ore of Dillsburg is described, and some striking illustrations of the manner in which the ore and trap occur in these formations are given on p. 234. Several sections of the mesozoic red beds are given, one of which exhibits two small anticlinals as interrupting the uniformity of their north dip. Prof. Frazer devotes especial attention to the difficult question of the dynamics of this formation, which has so long puzzled geologists. By a geometrical method, as applied to their structure, he reaches the conclusion that the measures of the New Red have not been disturbed by uplifts, as has generally been assumed.

Thorough explorations of limited areas, such as are described in the present reports, furnish the most exact knowledge available

for scientific generalization as well as for economic statistics. From both points of view the volumes before us justify the wisdom of the creation and support of the Second Geological Survey of Pennsylvania.

FOURTEEN WEEKS IN ZOÖLOGY, BY J. DORMAN STEELE.—The following facts in Natural History, which will be new to most readers of the *NATURALIST* are taken from Steele's "Fourteen Weeks in Zoölogy,"¹ a work by a "born school-book writer," lately published to "meet the popular demand" for instruction in Zoölogy.

"*Lophiide* (crested).—The Fishing frog has the ventral fins forward of the pectoral. The latter serve as legs and enable it to hop about upon the beach. Upon the head are three spines—the first, with a shiny membrane at the tip, fastened by a ring-and-staple joint and able to move in every direction; the other two turning only backward and forward. The sluggish creature lies in the mud at the bottom of the water, and waving the first spine, attracts the curious fishes with this glistening bait; but, as they nibble, the rear spines knock them into its capacious mouth" (p. 190).

"*Percide* (dusky).—*Perch* are found both in salt and fresh water. Their operculum is so constructed that they can be kept alive in the air for hours by occasionally pouring water upon their gills" (p. 191).

"*Siluride*.—The Cat-fish, or Horned pout, has a naked skin, and the mouth surrounded by tentacles" (p. 195).

"The *Hydrozoa* (water-dragon animals) or Jelly fishes, have no mesenteric spaces, and the eggs are developed on the external instead of the internal surface of the body wall. Interspersing the tentacles and other parts of the body are cells containing long, spirally-coiled threads, barbed and serrated, which dart forth with inconceivable velocity to lasso their prey. * * * Mere transparent masses of jelly and only visible because of their brilliant colors, they move through the water rapidly and lasso their prey with great precision" (p. 271). And so on wherever one opens the book.

It seems to me, that we who believe in the study of nature as a "means of grace," ought to protest earnestly against such burlesques on science as this work and its companions. "I told them that I was not the man for such work, and I told them, too, that the less of such work that is done the better. It is not school-books we want, but students. The book of nature is always open, and all I can do or say shall be to make them study that book and not to pin their faith to any other" (AGASSIZ).—D. S. F.

¹ *Fourteen Weeks in Zoölogy*. By J. DORMAN STEELE, Ph. D., F. G. S., author of the Fourteen Weeks Series in Natural Science. A. S. Barnes & Co. New York, Chicago and New Orleans, 1877.